

# **Exhibit L**

# **McGraw-Hill Dictionary of Scientific and Technical Terms**

## **Fifth Edition**

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Editor in Chief

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On the cover: Photomicrograph of crystals of vitamin B<sub>1</sub>.  
(Dennis Kunkel, University of Hawaii)

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#### McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, Fifth Edition

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**electron probe x-ray microanalysis** [ANALY CHEM] An analytical technique that uses a narrow electron beam, usually with a diameter less than 1 millimeter, focused on a solid specimen to excite an x-ray spectrum that provides qualitative and quantitative information characteristic of the elements in the sample. Abbreviated EPXMA. { i'lek, trān, 'prōb 'leks, rā, mī'krō'ā'nal'asās }

**electron radiography** [GRAPHICS] A technique for producing a photographic image of an opaque specimen by transmitting electrons through it onto an adjacent photographic film; the electrons are generated in a metal sheet adjacent to the specimen or in the specimen itself by x-rays. { i'lek, trān, 'rād'ē'ā'grā'fē }

**electron radius** [PHYS] The classical value  $r$  of  $2.81777 \times 10^{-13}$  centimeter for the radius of an electron; obtained by equating  $mc^2$  for the electron to  $e^2/r$ , where  $e$  and  $m$  are the charge and mass of the electron respectively; any classical model for an electron will have approximately this radius. { i'lek, trān, 'rād'ē'ās }

**electron-ray indicator** See cathode-ray tuning indicator. { i'lek, trān, 'rā 'in'dā,kād'ār }

**electron-ray tube** See cathode-ray tube. { i'lek, trān, 'rā,tüb }

**electron refraction** [ELECTR] The bending of an electron beam passing from one region to another of different electric potential. { i'lek, trān, rī'frak'shən }

**electron rest mass** See electron mass. { i'lek, trān, 'rest,mas }

**electron ring accelerator** [NUCLEO] Proposed particle accelerator in which protons to be accelerated are trapped by the space charge of a ring of relativistic electrons which is then accelerated. Abbreviated ERA. { i'lek, trān, 'rīŋ ak'sel'ā,rād'ār }

**electron shell** [ATOM PHYS] 1. The collection of all the electron states in an atom which have a given principal quantum number. 2. The collection of all the electron states in an atom which have a given principal quantum number and a given orbital angular momentum quantum number. { i'lek, trān, 'shel }

**electron spectroscopy** [SPECT] The study of the energy spectra of photoelectrons or Auger electrons emitted from a substance upon bombardment by electromagnetic radiation, electrons, or ions; used to investigate atomic, molecular, or solid-state structure, and in chemical analysis. { i'lek, trān, spek'trās-kā'pē }

**electron spectroscopy for chemical analysis** See x-ray photoelectron spectroscopy. { i'lek, trān, spek'trās-kā'pē fār 'kem'ikāl ā'nal'asās }

**electron spectrum** [SPECT] Visual display, photograph, or graphical plot of the intensity of electrons emitted from a substance bombarded by x-rays or other radiation as a function of the kinetic energy of the electrons. { i'lek, trān, 'spek'trəm }

**electron spin** [QUANT MECH] That property of an electron which gives rise to its angular momentum about an axis within the electron. { i'lek, trān, 'spīn }

**electron spin density** [PHYS] The vector sum of the spin angular momenta of electrons at each point in a substance per unit volume. { i'lek, trān, 'spīn,den'sadē }

**electron spin resonance** See electron paramagnetic resonance. { i'lek, trān, 'spīn,rez-ōn'āns }

**electron stain** [MATER] A substance such as phosphotungstic acid or osmic acid which scatters large numbers of electrons and can therefore be used to stain objects to be examined by an electron microscope. { i'lek, trān, 'stān }

**electron-stream potential** [ELECTR] At any point in an electron stream, the time average of the potential difference between that point and the electron-emitting surface. { i'lek, trān, 'strēm pō'ten'chəl }

**electron-stream transmission efficiency** [ELECTR] At an electrode through which the electron stream (beam) passes, the ratio of the average stream current through the electrode to the stream current approaching the electrode. { i'lek, trān, 'strēm trānz'mīsh'ən ā'fīsh'ōnsē }

**electron synchrotron** [NUCLEO] A circular electron accelerator in which the frequency of the accelerating system is constant, the strength of the magnetic guide field increases, and the electrons move in orbits of nearly constant radius. { i'lek, trān, 'sīŋkrō, trān }

**electron telescope** [ELECTR] A telescope in which an infrared image of a distant object is focused on the photosensitive cathode of an image converter tube; the resulting electron image

is enlarged by electron lenses and made visible by a fluorescent screen. { i'lek, trān, 'tel'ē'skōp }

**electron temperature** [PL PHYS] The temperature at which ideal gas molecules would have an average kinetic energy equal to that of electrons in a plasma under consideration. { i'lek, trān, 'tem'prā'chər }

**electron transfer** [PHYS] The passage of an electron from one constituent of a system to another. { i'lek, trān, 'trāns'fər }

**electron transition** [QUANT MECH] Change of an electron from one state to another, accompanied by emission or absorption of electromagnetic radiation. { i'lek, trān, trān'zīsh'ən }

**electron transport system** [BIOCHEM] The components of the final sequence of reactions in biological oxidations; composed of a series of oxidizing agents arranged in order of increasing strength and terminating in oxygen. { i'lek, trān, 'trāns,pōrt, 'sīstəm }

**electron trap** [SOLID STATE] A defect or chemical impurity in a semiconductor or insulator which captures mobile electrons in a special way. { i'lek, trān, 'trāp }

**electron tube** [ELECTR] An electron device in which conduction of electricity is provided by electrons moving through a vacuum or gaseous medium within a gastight envelope. Also known as radio tube; tube; valve (British usage). { i'lek, trān, 'tüb }

**electron-tube amplifier** [ELECTR] An amplifier in which electron tubes provide the required increase in signal strength. { i'lek, trān, 'tüb, 'āmp'lā,frər }

**electron-tube generator** [ELECTR] A generator in which direct-current energy is converted to radio-frequency energy by an electron tube in an oscillator circuit. { i'lek, trān, 'tüb, 'jen'ā,rād'ār }

**electron-tube heater** See heater. { i'lek, trān, 'tüb, 'hēd'ār }

**electron-tube static characteristic** [ELECTR] Relation between a pair of variables such as electrode voltage and electrode current with all other voltages maintained constant. { i'lek, trān, 'tüb, 'stād'ik kar'ik'tā'ris'tik }

**electron tunneling** [QUANT MECH] The passage of electrons through a potential barrier which they would not be able to cross according to classical mechanics, such as a thin insulating barrier between two superconductors. { i'lek, trān, 'tān'el'īŋ }

**electronuclear breeder** See linear accelerator breeder. { i'lek, trō, 'nū'klē'ār, 'brēd'ār }

**electron vacuum gage** [ENG] An instrument used to measure vacuum by the ionization effect that an electron flow (from an incandescent filament to a charged grid) has on gas molecules. { i'lek, trān, 'vak'yūm, gāj }

**electronvolt** [PHYS] A unit of energy which is equal to the energy acquired by an electron when it passes through a potential difference of 1 volt in a vacuum; it is equal to  $(1.602192 \pm 0.000007) \times 10^{-19}$  volt. Abbreviated eV. { i'lek, trān, 'vōlt }

**electron voltaic effect** [ELECTR] Sensitivity of photovoltaic cells to electron bombardment. { i'lek, trān, 'vōl'tā'ik i, fekt }

**electron wave** [QUANT MECH] The de Broglie wave or probability amplitude wave of an electron. { i'lek, trān, 'wāv }

**electron wave function** [QUANT MECH] Function of the spin orientation and position of one or more electrons, specifying the dynamical state of the electrons; the square of the function's modulus gives the probability per unit volume of finding electrons at a given position. { i'lek, trān, 'wāv, fāŋk'shən }

**electron wavelength** [QUANT MECH] The de Broglie wavelength of an electron, given by Planck's constant divided by the momentum. { i'lek, trān, 'wāv, lēŋkth }

**electrooptical birefringence** See electrooptical Kerr effect. { i'lek, trō, 'āptō'kāl bī'rī'frīŋ'jāns }

**electrooptical character recognition** See optical character recognition. { i'lek, trō, 'āptō'kāl 'kar'iktər, rek'ig, nīsh'ən }

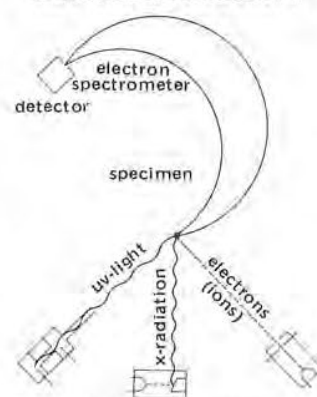
**electrooptical Kerr effect** [OPTICS] Birefringence induced by an electric field. Also known as electrooptical birefringence; Kerr effect. { i'lek, trō, 'āptō'kāl 'kər i, fekt }

**electrooptical modulator** [COMMUN] An optical modulator in which a Kerr cell, an electrooptical crystal, or other signal-controlled electrooptical device is used to modulate the amplitude, phase, frequency, or direction of a light beam. { i'lek, trō, 'āptō'kāl 'māj'ā, lād'ār }

**electrooptic material** [OPTICS] A material in which the indices of refraction are changed by an applied electric field. { i'lek, trō, 'āptīk māt'ir'ē'əl }

**electrooptic radar** [ENG] Radar system using electrooptic

## ELECTRON SPECTROSCOPY



Excitation of electron spectra recorded in high-resolution instruments.



techniques and equipment instead of microwave to perform the acquisition and tracking operation. (i,lek-trō'āp-tik 'rā,dār)

**electrooptics** [OPTICS] The study of the influence of an electric field on optical phenomena, as in the electrooptical Kerr effect and the Stark effect. Also known as optoelectronics. (i,lek-trō'āptiks)

**electroosmosis** [PHYS CHEM] The movement in an electric field of liquid with respect to colloidal particles immobilized in a porous diaphragm or a single capillary tube. (i,lek-trō'ās'mō'səs)

**electroosmotic driver** [ELECTR] A type of solenoid for converting voltage into fluid pressure, which uses depolarizing electrodes sealed in an electrolyte and operates through the streaming potential effect. Also known as micropump. (i,lek-trō'āz'mād-ik 'driv-ər)

**electropainting** [ENG] Electrolytic deposition of a thin layer of paint on a metal surface which is made an anode. (i'lek-trō,pānt-īŋ)

**electropherography** See electrochromatography. (i'lek-trō'fā'rāgrāf-ē)

**electrophile** [PHYS CHEM] An electron-deficient ion or molecule that takes part in an electrophilic process. (i'lek-trō,fīl)

**electrophilic** [PHYS CHEM] 1. Pertaining to any chemical process in which electrons are acquired from or shared with other molecules or ions. 2. Referring to an electron-deficient species. (i'lek-trō'fīlik)

**electrophilic reagent** [PHYS CHEM] A reactant which accepts an electron pair from a molecule, with which it forms a covalent bond. (i,lek-trō'fīlik rē'aj-ənt)

**electrophonic effect** [BIOPHYS] The sensation of hearing produced when an alternating current of suitable frequency and magnitude is passed through a person. (i,lek-trō'fānik-i'fekt)

**electrophoresis** [PHYS CHEM] An electrochemical process in which colloidal particles or macromolecules with a net electric charge migrate in a solution under the influence of an electric current. Also known as cataphoresis. (i,lek-trō'fā'rē'səs)

**electrophoretic coating** [MET] A surface coating on a metal deposited by electric discharge of particles from a colloidal solution. (i,lek-trō'fā'red-ik 'kōd-īŋ)

**electrophoretic display** [OPTICS] A liquid crystal display in which a light-absorbing dye has been added to the liquid to improve both color and luminance contrast. (i,lek-trō'fā'red-ik di'splā)

**electrophoretic effect** [PHYS CHEM] Retarding effect on the characteristic motion of an ion in an electrolytic solution subjected to a potential gradient, which results from motion in the opposite direction by the ion atmosphere. (i,lek-trō'fā'red-ik i'fekt)

**electrophoretic mobility** [BIOCHEM] A characteristic of living cells in suspension and biological compounds (proteins) in solution to travel in an electric field to the positive or negative electrode, because of the charge on these substances. (i,lek-trō'fā'red-ik mō'bīl-əd-ē)

**electrophoretic variants** [BIOCHEM] Phenotypically different proteins that are separable into distinct electrophoretic components due to differences in mobilities; an example is erythrocyte acid phosphatase. (i,lek-trō'fā'red-ik 'ver-ē-əns)

**electrophorus** [ELEC] A device used to produce electric charges; it consists of a hard-rubber disk, which is negatively charged by rubbing with fur, and a metal plate, held by an insulating handle, which is placed on the disk; the plate is then touched with a grounded conductor, so that negative charge is removed and the plate has net positive charge. (i,lek'trā'fō-rəs)

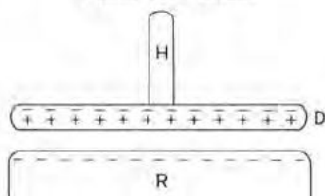
**electrophotograph** [GRAPHICS] An image formed by means of an electrostatic copying system. (i,lek'trō'fōd-ə'graf)

**electrophotography** [GRAPHICS] An electrostatic image-forming process in which light, x-rays, or gamma rays form an electrostatic image on a photoconductive, insulating medium; the charged image areas attract and hold a fine powder called a toner, and the powder image is then transferred to paper or fused there by heat. (i,lek'trō'fōd-ə'grāf-ē)

**electrophotoluminescence** [ELECTR] Emission of light resulting from application of an electric field to a phosphor which is concurrently, or has been previously, excited by other means. (i,lek'trō'fōd-ō,lū-mā'nes-əns)

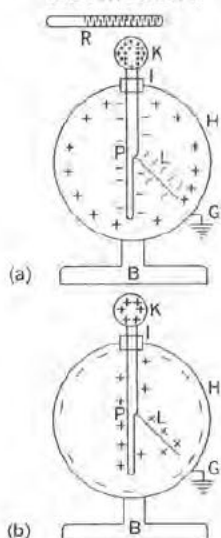
**electrophoretic phoresis** [PHYS] Helical motion of small particles suspended in a gas along the direction of an electric field when exposed to a beam of light. (i,lek'trō'fōd-ə'fā'rē'səs)

### ELECTROPHORUS



An electrophorus; when the metal plate D with insulating handle H is placed on the rubber plate R, charge is induced as shown.

### ELECTROSCOPE



Simple gold-leaf electroscope. (a) An electroscope being charged by induction by negative charge on hard-rubber rod R. (b) Positive charge left on its leaf after induction process is complete. L = gold leaf, P = metal post, I = insulator, K = metal knob, H = metal housing, B = base, R = rubber rod, G = ground.

**electrophrenic respiration** [MED] Artificial respiration in which the nerves that control breathing are stimulated electrically through appropriately placed electrodes. (i,lek'trā'fren-ik ,res-pə'rā-shən)

**electrophysiology** [PHYSIO] The branch of physiology concerned with determining the basic mechanisms by which electric currents are generated within living organisms. (i,lek'trō,fiz-ē'ā-lō-jē)

**electroplating** [MET] Electrodeposition of a metal or alloy from a suitable electrolyte solution; the article to be plated is connected as the cathode in the electrolyte solution; direct current is introduced through the anode which consists of the metal to be deposited. (i'lek'trō,plād-īŋ)

**electroplax** [VERT ZOO] One of the structural units of an electric organ of some fishes, composed of thin, flattened plates of modified muscle that appear as two large, waterlike, roughly circular or rectangular surfaces. (i'lek'trō,plaks)

**electropolishing** [MET] Smoothing and enhancing the appearance of a metal surface by making it an anode in a suitable electrolyte. Also known as electrolytic brightening; electrolytic polishing. (i,lek'trō'pāl-ē-shīŋ)

**electroporation** [BIOL] The application of electric pulses to increase the permeability of cell membranes. [CYTOL] The application of electric pulses to animal cells or plant protoplasts to increase membrane permeability. (i,lek'trō'pə'rā-shən)

**electropositive** [ELEC] 1. Carrying a positive electric charge. 2. Capable of acting as the positive electrode in an electric cell. [PHYS CHEM] Pertaining to elements, ions, or radicals that tend to give up or lose electrons. (i,lek'trō'pāz-əd-iv)

**electropositive potential** [PHYS CHEM] Potential of an electrode expressed as positive with respect to the hydrogen electrode. (i,lek'trō'pāz-əd-iv pə'ten-shəl)

**electropulse engine** [AERO ENG] An engine, for propelling a flight vehicle, that is based on the use of spark discharges through which intense electric and magnetic fields are established for periods ranging from microseconds to a few milliseconds; a resulting electromagnetic force drives the plasma along the leads and away from the spark gap. (i'lek'trō,pals ,en-jən)

**electrorefining** [CHEM ENG] Petroleum refinery process for light hydrocarbon streams in which an electrostatic field is used to assist in separation of chemical treating agents (acid, caustic, doctor) from the hydrocarbon phase. [MET] Purifying metals by electrolysis using an impure metal as anode from which the pure metal is dissolved and subsequently deposited at the cathode. Also known as electrolytic refining. (i,lek'trō'ri'fīŋ)

**electroreflectance** [SPECT] Electromodulation in which reflection spectra are studied. Abbreviated ER. (i,lek'trō'ri'flek-təns)

**electroresistive effect** [ELECTR] The change in the resistivity of certain materials with changes in applied voltage. (i,lek'trō'ri'zist-iv i'fekt)

**electroretinogram** [MED] A graphic recording of the electric discharges of the retina. Abbreviated ERG. (i,lek'trō'ret-ə'grām)

**electrorheological fluid** [PHYS CHEM] A colloidal suspension of finely divided particles in a carrier liquid, usually an insulating oil, whose rheological properties are changed through an increase in resistance when an electric field is applied. (i,lek'trō,rē-ə'lāj-ə-kəl 'flū-əd)

**electrorheological material** [MATER] A material possessing rheological properties that are controlled by an imposed electric field. (i,lek'trō,rē-ə'lāj-ə-kəl māt'ir-ē-əl)

**electroscope** [ENG] An instrument for detecting an electric charge by means of the mechanical forces exerted between electrically charged bodies. (i'lek'trō,skōp)

**electrosensitive paper** [MATER] A conductive paper that darkens when electric current is sent through it. (i,lek'trō'sen-səd-iv 'pā-pər)

**electrosensitive recording** [ELECTR] Recording in which the image is produced by passing electric current through the record sheet. (i,lek'trō'sen-səd-iv ri'kōrd-īŋ)

**electroshock therapy** [MED] Treatment of mental patients by passing an electric current of 85-110 volts through the brain. (i'lek'trō,shāk 'ther-ə-pē)

**electroslag welding** [MET] A welding process in which consumable electrodes are fed into a joint containing flux; the current melts the flux, and the flux in turn melts the faces of the joint and the electrodes, allowing the weld metal to form a



## thread blight

together. [DES ENG] A continuous helical rib, as on a screw or pipe. [GEOL] An extremely small vein, even thinner than a stringer. [MIN ENG] A more or less straight line of stall faces, having no cuttings, loose ends, fast ends, or steps. [TEXT] A continuous strand formed by spinning and twisting together short strands of textile fibers. { 'θrɛd }  
**thread blight** [PL PATH] A fungus disease of a number of tropical and semitropical woody plants, including cocoa and tea, caused by species of *Pellicularia* and *Marasmius* which form filamentous mycelia on the surface of twigs and leaves. { 'θrɛd blɪt }

**thread contour** [DES ENG] The shape of thread design as observed in a cross section along the major axis, for example, square or round. { 'θrɛd kən'tʊr }

**thread count** [TEXT] An index of the compactness of a fabric determined by counting the number of warp yarns and filling yarns in 1 square inch (6.4516 square centimeters) of fabric. Also known as cloth count. { 'θrɛd kaʊnt }

**thread cutter** [MECH ENG] A tool used to cut screw threads on a pipe, screw, or bolt. { 'θrɛd kʌtər }

**threadfin** [VERT ZOO] Common name for any of the fishes in the family Polynemidae. { 'θrɛd,fin }

**thread gage** [DES ENG] A design gage used to measure screw threads. { 'θrɛd gæj }

**threading die** [MECH ENG] A die which may be solid, adjustable, or spring adjustable, or a self-opening die head, used to produce an external thread on a part. { 'θrɛdɪŋ di }  
**threading machine** [MECH ENG] A tool used to cut or form threads inside or outside a cylinder or cone. { 'θrɛdɪŋ məʃɪn }

**thread-lace scoria** [GEOL] Scoria whose vesicle walls have collapsed and are represented only by a network of threads. { 'θrɛd lās 'skɔːrɪə }

**thread plug** [ENG] Mold part which shapes an internal thread onto a molded article; must be unscrewed from the finished piece. { 'θrɛd plʌg }

**thread plug gage** [DES ENG] A thread gage used to measure female screw threads. { 'θrɛd plʌg gæj }

**thread protector** [ENG] A short-threaded ring to screw onto a pipe or into a coupling to protect the threads while the pipe is being handled or transported. Also known as pipe-thread protector. { 'θrɛd prə'tektər }

**thread rating** [ENG] The maximum internal working pressure allowable for threaded pipe or tubing joints; important for pressure systems, chemical processes, and oil-well systems. { 'θrɛd rætɪŋ }

**thread ring gage** [DES ENG] A thread gage used to measure male screw threads. { 'θrɛd rɪŋ gæj }

**thread waste** [TEXT] The hard, thready waste left on bobbins or collected during operations such as spinning, twisting, and weaving. { 'θrɛd wæst }

**threat collision avoidance system** [NAV] A system, based on air-traffic control transponders installed on aircraft, that issues an evasive maneuver command when it senses a collision threat. { 'θrɛt kə'lɪʒən ə'vɔɪd-əns,sɪstəm }

**three-address code** [COMPUT SCI] In computers, a multiple-address code which includes three addresses, usually two addresses from which data are taken and one address where the result is entered; location of the next instruction is not specified, and instructions are taken from storage in preassigned order. { 'θrɛ 'ad, res ,kɒd }

**three-address instruction** [COMPUT SCI] In computers, an instruction which includes an operation and specifies the location of three registers. { 'θrɛ 'ad, res ɪn'strʌkʃən }

**three-alpha process** [ASTROPHYS] A nuclear reaction in which three helium-4 nuclei (alpha particles) combine to form a carbon-12 nucleus, with the emission of a gamma ray; it converts helium into carbon in red giants. Also known as Salpeter process; triple-alpha process. { 'θrɛ 'al-fə 'prɪ, səs }

**three-arm protractor** [NAV] An instrument consisting essentially of a circle graduated in degrees, to which is attached one fixed arm and two arms pivoted at the center and provided with clamps so that they can be set at any angle to the fixed arm, within the limits of the instrument; used for finding a ship's position when the angles between three fixed and known points are measured. Also known as station pointer. { 'θrɛ 'ɑːm prə'træktər }

**three-body problem** [MECH] The problem of predicting the motions of three objects obeying Newton's laws of motion and

## three-phase four-wire system

2025

attracting each other according to Newton's law of gravitation. { 'θrɛ 'bɑːd-ē ,prəbləm }

**three-day fever** See phlebotomus fever. { 'θrɛ 'dæ 'fɛvər }

**three-decibel coupler** [ELECTROMAG] Junction of two waveguides having a common H wall; the two guides are coupled together by H-type aperture coupling; the coupling is such that 50% of the power from either channel will be fed into the other. Also known as Riblet coupler; short-slot coupler. { 'θrɛ 'des ə'bəl 'kʌplər }

**three-decision problem** [STAT] A problem in which a choice must be made among three possible courses of action. { 'θrɛ dɪ'sɪʒən ,prəbləm }

**three-dimensional** [SCI TECH] Giving the illusion of depth, in three dimensions. { 'θrɛ dɪ'menʃənəl }

**three-dimensional braiding** See through-the-thickness braiding. { 'θrɛ dɪ'menʃənəl 'brɑɪdɪŋ }

**three-dimensional display system** [ELECTR] A radar display which shows range, azimuth, and elevation; for instance, a G display. { 'θrɛ dɪ'menʃənəl dɪ'splæ ,sɪstəm }

**three-dimensional flow** [FL MECH] Any fluid flow which is not a two-dimensional flow. { 'θrɛ dɪ'menʃənəl 'flɒ }

**three-eighths rule** [MATH] 1. An approximation formula for definite integrals which states that the integral of a real-valued function  $f$  on an interval  $[a, b]$  is approximated by  $(3/8)h[f(a) + 3f(a + h) + 3f(a + 2h) + f(b)]$ , where  $h = (b - a)/3$ ; this is the integral of a third-degree polynomial whose value equals that of  $f$  at  $a, a + h, a + 2h$ , and  $b$ . 2. A method of approximating a definite integral over an interval which is equivalent to dividing the interval into equal subintervals and applying the formula in the first definition to each subinterval. { 'θrɛ 'aɪθs ,rʌl }

**three-index symbols** See Christoffel symbols. { 'θrɛ 'ɪn, deks 'sɪmbəlz }

**three-input adder** See full adder. { 'θrɛ 'ɪn, pʊt 'ad-ər }

**three-input subtracter** See full subtracter. { 'θrɛ 'ɪn, pʊt sʌb'træktər }

**three-jaw chuck** [DES ENG] A drill chuck having three serrated-face movable jaws that can grip and hold fast an inserted drill rod. { 'θrɛ 'jɔ 'tʃʌk }

**three-j number** [QUANT MECH] A coefficient used in coupling eigenfunctions of two commuting angular momenta to form eigenfunctions of the total angular momentum; closely related to the Clebsch-Gordan coefficients. Also known as Wigner 3-j symbol. { 'θrɛ 'jɔ 'nʌm-bər }

**three-junction transistor** [ELECTR] A  $pnpn$  transistor having three junctions and four regions of alternating conductivity; the emitter connection may be made to the  $p$  region at the left, the base connection to the adjacent  $n$  region, and the collector connection to the  $n$  region at the right, while the remaining  $p$  region is allowed to float. { 'θrɛ 'jʌŋkʃən træn'zɪstər }

**three-kiloparsec arm** [ASTRON] A region approximately 3 kiloparsecs from the galactic center that displays strong absorption in the 21-centimeter line of atomic hydrogen. { 'θrɛ 'kɪl ə'pɑː, sek 'ɑːrm }

**three-layer diode** [ELECTR] A junction diode with three conductivity regions. { 'θrɛ 'lɑːər 'dɪ, əd }

**three-level laser** [OPTICS] A laser involving three energy levels, one of which is the ground state; laser action usually occurs between the intermediate and ground states. { 'θrɛ 'lev-əl 'lā-zər }

**three-level maser** [PHYS] A solid-state maser in which three energy levels are used; successful operation has been obtained with crystals of gadolinium ethyl sulfate and crystals of potassium chromocyanide at the temperature of liquid helium. { 'θrɛ 'lev-əl 'mā-zər }

**three-level subroutine** [COMPUT SCI] A subroutine in which a second subroutine is called, and a third subroutine is called by the second subroutine. { 'θrɛ 'lev-əl 'səb-rʊ, tɛn }

**threeeling** See trilling. { 'θrɛɪŋ }

**three-phase circuit** [ELEC] A circuit energized by alternating-current voltages that differ in phase by one-third of a cycle or 120°. { 'θrɛ 'fāz 'sɑːkɪt }

**three-phase current** [ELEC] Current delivered through three wires, with each wire serving as the return for the other two and with the three current components differing in phase successively by one-third cycle, or 120 electrical degrees. { 'θrɛ 'fāz 'kərənt }

**three-phase four-wire system** [ELEC] System of alternating-current supply comprising four conductors, three of which